

**Tropical Storm Irene:
A Retrospective on Mental and Emotional Impacts on
Vermont Communities, Three Years Later**



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Introduction

Analyses of climate trends and weather patterns demonstrate that climate change has, and will, continue to increase both the frequency and severity of storm events. Extreme weather events are occurring globally, resulting in widespread economic and social consequences. In the last ten years alone, three major tropical storms have swept over the United States: Hurricane Katrina (2005), Tropical Storm Irene (2011), and Hurricane Sandy (2012). Hurricanes and tropical storms often form over the Atlantic Ocean, and as such, the majority damage the coastal regions of the eastern United States.

Over the last 50 years, the northeast has experienced a 67% increase in heavy storm precipitation, the highest observed increase for all regions in the nation (Hodgkins et al.). In Vermont, the global increase in annual temperatures has shifted the timing and length of its seasons, resulting in heavier rainfall and unpredictable frosts (Betts). Though Vermont has a long-standing history of flooding, severe storms such as Tropical Storm Irene are rare. The state is currently exploring the economic and environmental consequences of destructive storms, but little research has been conducted on the nature of the mental and emotional health consequences of experiencing these storms.

Multiple studies suggest that the destructive nature of large storms has the potential to affect mental health, inducing emotional consequences such as anxiety, denial, depression and PTSD, but there is a lack of literature addressing the mental health impacts of climate change specifically (Doherty et al., Berry et al., Otto et al., Green, Tapsell et al., Coyle et al.). In order to inform the disaster preparation process and to work towards identifying psychosocial support networks, we need more research on the mental impact of environmental disasters such as Tropical Storm Irene. In our study, we begin to ask how these mental and emotional health

impacts are experienced, understood, and processed within peoples' varied understandings of and responses to climate change.

In response to Vermont's increasing vulnerability to flooding and weather disasters, the Vermont Department of Health developed a "Building Resilience Against Climate Effects" (BRACE) Report, as part of a movement initiated by the US Center for Disease Control to develop public health adaptation strategies (Vermont Department of Health). Although there is general, well-documented research showing that mental health symptoms such as PTSD and anxiety can develop in the aftermath of natural disasters, the discourse connecting mental health and climate change effects is only beginning to emerge. This uncertainty is made clear in the BRACE Report:

Mental illness presents a substantial burden in Vermont. It is however difficult to know what portion of the mental illness burden in Vermont is related to climate. Between almost annual extreme heat events and flooding events alone, it appears likely that climate-related threats to mental health are resulting in substantial morbidity.

(Vermont Department of Health, 91)

Further study of the ways in which the consequences of natural disasters slowly manifest over a long-term period as well as how the impact is dispersed throughout a community is integral in developing effective mental health programs in a climate-ready Vermont.

Our Study

We designed our study in an effort to begin to fill in this lack of information on the relationship between climate change threats and mental and emotional health impacts. We developed three main questions that our study sought to explore:

1. What were the emotional impacts on Vermont communities during and after Tropical Storm Irene?
2. What factors contributed to better wellbeing among individual people?
3. What do communities still lack in the face of future climate change threats?

We chose to study the aftermath of Tropical Storm Irene, the storm that devastated many Vermont towns in late August 2011. Having hit only three years ago, Irene is still recent enough in people's memories, yet far enough away that most of the visible damage has been cleaned up, infrastructure has been repaired, and any lingering impacts remain mostly unseen in people's private lives. Although flooding is a common threat in Vermont, hurricane-level storms like Irene are atypical in the Green Mountain Valley, and as such have been linked to the larger pattern of increasing storm frequency and intensity across the nation, due to global climate change.

Focusing on this storm allowed us to address three of the avenues through which climate change may exacerbate or trigger mental illness, according to the BRACE report. These avenues are anxiety and PTSD associated with experiencing a catastrophic weather event, distress associated with environmental degradation and displacement (including loss of and changes to a loved home), and despair and uncertainty about climate change (73).

We focused our study primarily on Rochester, Vermont. Besides the convenience of its relative proximity to Middlebury, almost the entire town of Rochester was particularly devastated by Irene, due to its position in the valley of the Green Mountains and because the White River runs parallel to Route 100, the main road in town.

In studying rural areas of Vermont strongly impacted by flood and other destruction, we aim to characterize the range of emotional health impacts that directly resulted from or were exacerbated by Tropical Storm Irene and the recovery process. It is our hope that our findings illuminate some ways in which the Vermont Department of Health may better serve Vermonters, with particular attention to vulnerable populations.

Tropical Storm Irene

Forming in the Caribbean, Tropical Storm Irene was a tropical cyclone that moved into the eastern United States in late August of 2011. It dealt enormous damage in the Caribbean before hitting the Outer Banks of North Carolina on August 27, seven days after formation. In this time period it weakened from a Category 3 storm to a Category 1 storm before breaching the United States. Nevertheless, the magnitude of damage was severe, costing the US an estimated \$15.6 billion dollars (Avila and Cangialosi). It is considered the seventh most expensive storm disaster in US history, five of the proceeding six storms having occurred in the 2000s (“List of Costliest Atlantic Hurricanes”).

Vermont represents one of the many states affected by Irene. After passing through North Carolina, Irene proceeded north through New York City before veering northwest into Vermont late on August 28th. Vermont state officials urged the public to prepare for Irene as early as August 26th, although Governor Shumlin officially declared a State of Emergency on August 27th (“VT Governor Declares”). In anticipation of the storm, he cautioned Vermonters “to realize that in all likelihood it will change rapidly tomorrow, and therefore, now is the time to plan” (“VT Governor Declares”). The general anticipation at this time was power failure due to fallen trees. The wind speed was projected for 60 mph in some parts of the state. Central

Vermont Public Service and Green Mountain Power prepared by bringing in extra utility crews from around the country to respond to the expected power outages. FEMA deployed approximately 500 reservists to Vermont for similar causes (“Irene: Reflections”). The Vermont Air National Guard deployed roughly 300 people (“Irene: Reflections”).

In the days leading up to Irene, extensive preparation was also made in order to combat flooding. Public Safety Commissioner Kevin Flynn said, “Flooding is going to be our biggest issue. It’s not unreasonable to expect that all major Vermont rivers, based on these forecasts, will possibly flood” (“VT Governor Declares”). The state’s emergency operation center in Waterbury was expected to stay open for the duration of the storm, but the state had not anticipated the level of flooding that occurred on August 28th and 29th.

Vermont’s water tributaries filled up quickly. The National Weather Service had anticipated 2-5 inches of rain in the Champlain Valley and 3-7 inches in the Green Mountains (Burlington Free Press August 26, 2011). Many regions experienced the upward bounds of their projections, with many regions in the Green Mountains seeing 7-11 inches of rain in the two-day period (“Operation Connection”, “Irene: Reflections”). Soils that were already saturated from previous summer rainfall could not absorb the volume of water that Irene deposited. Creeks, streams and rivers swelled up over their banks and widespread flooding, particularly in the Green Mountains, became severe. Eleven of the twenty USGS stream gaging stations set new record peak stream flows and peak stages (“High Flows”). Of the forty-four nationwide victims of Irene recognized by August 30th, three were killed in floods in Vermont (CNN Wire). Six deaths are now officially recognized (“Irene: Reflections”).

Vermonters faced several major issues in the wake of Irene, the first being the destruction of major roadways and bridges for transportation uses. Public roads and interstates began closing

by August 28th. Due to damage, some were not reopened until months later. High water levels damaged roughly 2,100 local road segments, 350 bridges and 1,000 culverts (“Operation Connections”). This constituted approximately 500 miles of state roadway that required repair (“Irene: Reflections”). The reconstruction of these roads was originally estimated at \$700 million, although this was adjusted and all road-work was completed at the cost of \$175-250 million (Schwartz 2011). By November 2011 (two months later), 66 bridges and 119 road segments remained closed (“Operation Connections”).

Thirteen communities in the state were completely cut off due to road damage within the first week of Irene (“Irene: Reflections”). Roughly 3,500 homes were damaged, of which approximately 525 were mobile homes. The Vermont Disaster Relief Fund raised over \$8 million to primarily help owners of mobile homes that had been destroyed (“Irene: Reflections”). Over 7,200 residents registered for FEMA aid after Irene by the end of 2011 (“More than 7,200 Vermonters”). 225 of Vermont’s 251 towns reported damage to public infrastructure (“Irene: Reflections”). Vermont garnered \$850.54 million in aid, an impressive \$40 million of which came from local and private sources (“Irene: Reflections”).

By the end of the storm, Tropical Storm Irene put roughly 20,000 acres of farmland underwater. According to UVM’s publication, *Impact of Irene on Vermont Agriculture*, the USDA reported that 476 farms filed losses in pasture, hay, corn, sugarbush, fruits and vegetables, and soybeans (“Impacts of Irene”). This culminated in damage to 9,100 acres and an estimated \$20 million in farm losses.

Loss of electric power was a widespread public emergency across the state. Over 72,000 of Central Vermont Public Services’ customers were without power, only half of these being restored in the proceeding 24 hours (Rivers). Despite early concerns that power restoration

would take multiple weeks, the entire state's power lines were restored within one week. The Rochester area is one of many places that lost power and had severe damages to public infrastructure.

Geography and Geology of Rochester

The town of Rochester, Vermont lies within the Green Mountain range. Rochester Gap rises up to the East of the town while the mountains border the West. It is in a small valley that was created by the White River. The White River runs just west of Rochester. There are also fifteen other brooks that run like tributaries from the mountains to the White River in Rochester and the Winooski Basin ("Rochester Town, Vermont Geography Analysis"). The water is funneled from the upper sections of the mountains down to areas of lower elevation, where it collects in the White River and the town of Rochester. The town has an area of 56.2 square miles, of which 56.1 square miles is land and 0.1 square mile is water during the regular seasons ("Rochester, Vermont") (Figure 1).

The connection between the topography of the Green Mountains and the geography of Rochester is important for understanding why this area experiences intensive flooding during major storms or seasons with lots of rain or snow. During a particularly rainy summer in the Green Mountains, the soil that sits on top of the bedrock has the potential to become supersaturated, the point at which it can no longer absorb any more water. If the soil reaches supersaturation, any rain on the land runs down the mountainside past the already full tributaries to areas of lower elevation such as the valley floor. In areas with less soil and vegetative cover, the water will run downslope faster because the serpentinite bedrock can not be penetrated by water (Pat Manley). Rain runoff funnels down to the valley floor, where it floods Rochester, the White River and other surrounding towns and water bodies.

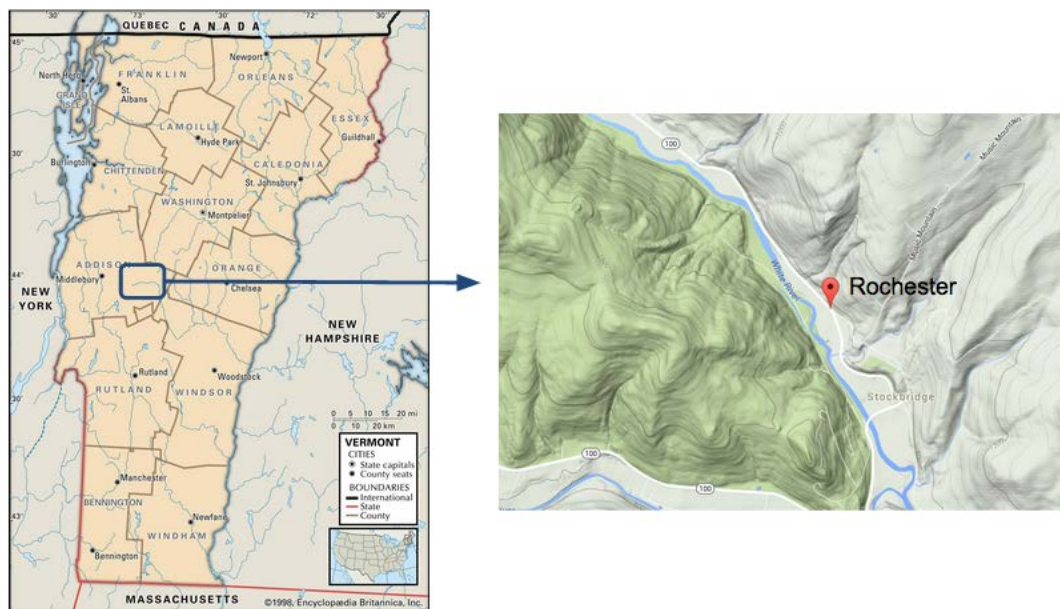


Figure 1. Map of Vermont highlighting the location of Rochester and a topographic map of Rochester that shows the elevation of the surrounding area (<http://www.mapofus.org/vermont/> and Google Maps).

The Flood of 1927 was the last flood event in Rochester with community devastation comparable to Irene. There were eighty-four fatalities, the largest in Vermont history from a natural event (“Flooding in Vermont”). Prior to the actual flooding event, the region experienced 200% more rainfall than normal, which caused oversaturation of the ground and the runoff surged into the valley. After the flood, the Army Corps of Engineers built three retention reservoirs and dams in this basin and in the towns of East Barre, Waterbury, and Wrightsville to mitigate further flooding (“Flooding in Vermont”). Through looking at this previous flood we can see that this area has been predispositioned for heavy flooding at times of heavy rain late in the summer. We can also see that this area has been predispositioned for extensive damage due to development patterns. For example, flooding did particular damage to roadways that were built close to the river or mountain passes built in channels on the mountainside. Most of these roadways were rebuilt in the same area and were again destroyed with the flooding associated

with Irene. Hopefully in the future we can use this information to create infrastructure that is as resilient as the people of the town of Rochester.

Rochester, Vermont and Tropical Storm Irene

According to the most recent US Census (2010), at the time of storm Rochester was home to a predominantly white (94.6%) population of 1,139 citizens. The median age was 50.1 years, 5 years older than the Vermont median, and the median household income was \$45,740, roughly \$7,000 less than the Vermont median household income (US Census Bureau).

The center of town is built in the valley along VT Route 100 (Main St.), which runs parallel to the White River. Tropical Storm Irene resulted in substantial flooding in the central part of town and washed out extensive portions of this main road (Figure 2). Town infrastructure suffered notable destruction; for example, the storm flooded 13,000 square feet of the Rochester School (McGilvery). Damage to Route 100 and loss of power isolated the town from outside communication for seven days. The storm also washed out Route 73 at the bridge entrance into the town center and at the other end of the town periphery. This contributed to the isolation of roughly 100 citizens from the rest of the community for three days. Heavy rainfall combined with mountain runoff transformed a brook behind the Rochester Woodlawn Cemetery into a raging river, resulting in extensive cemetery damage. Water flow disturbed roughly fifty caskets, beginning an expensive and traumatic effort to recover and restore gravesites based on relatives' memories and, in some cases, DNA analysis (Ring). However, despite the extent of the damage, the town suffered no mortalities (Curran).



Figure 2. Photographs that exemplify the residential and infrastructure damage sustained during Tropical Storm Irene in the Rochester, VT area (USA Today, Burlington Free Press, Vermont Agency of Natural Resources, VPR News).

Even prior to the arrival of government resources, the Rochester community demonstrated impressive resilience in the face of these challenges. Citizens gathered at 1pm every day in the Federated Church of Rochester in the center of town to receive updates on day-to-day progress. The community pooled skills to restore roads and badly damaged houses. Restaurants, markets, cafes, and convenience stores donated perishable food items to feed the community. Citizens with 4-wheel drive vehicles transported two individuals in need of medical attention to the nearest hospital (Curran).

Three days after the storm, FEMA was finally able to get to Rochester to assist in recovery and cleanup after the storm (“Irene: Reflections”). Using helicopters, the National Guard made several drops of MRE (Meals Ready to Eat) boxes and blankets to Rochester citizens in the week immediately following the storm (Curran).

In the months after Irene, FEMA disaster workers attended events like farmers markets and art shows in order to promote safer rebuilding and disaster preparation (“FEMA Outreach Workers”). Many disaster recovery centers were open for several months to help Vermonters recover financially and to make recommendations on steps to take with FEMA funding (“Two More Recovery Centers”). In Rochester alone, FEMA ran 65 individual projects of infrastructure repair (Shulins).

Although the federal government stepped in to promote physical and financial stability, the state was responsible for creating resources directed at promoting mental health and providing trauma counseling. Immediately after Irene, emergency services such as mobile crisis units were deployed by the state in order to attend to people physically and mentally affected by the storm (Margaret Joyal). Starting Over Strong Vermont (SOS VT) was a program created to deploy crisis support workers to affected communities after the storm (“Starting Over Vermont”). They conducted at-home outreach and provided a variety of mental health stabilization services broader than traditional therapy (Margaret Joyal). Their services catered to children, adults, the elderly, and people already suffering from mental illness and were available by phone in all affected regions of Vermont. The crisis support workers focused on psychosocial issues such as recurring nightmares, numbness, trouble concentrating, bursts of anger and irritability, overprotectiveness, tearfulness, and physical symptoms like headaches (Margaret Joyal). In addition to at-home visits, SOS VT held support groups in a number of towns greatly affected by the storm (“Starting Over Vermont”). A Tropical Storm Irene Support Group met at the Rochester High School Library every Monday for several weeks, while another Tropical Storm Irene Support Group met in Waterbury several times over the course of two months (“Starting Over Vermont”).

Although there was a slight increase in the request for mental health services in Vermont in the months following Irene, not many people took advantage of these services (Margaret Joyal). “We didn’t see a big influx of clients right after Irene, because I think people really were just busy trying to figure out where they were sleeping that night,” explained Margaret Joyal, the Director of Washington County Health Services. Most of the mental health services provided by the state were only available for several months. During this time, the residents of Rochester were busy rebuilding their lives, and by the time they were able to address any emotional trauma, many of these local services had already disbanded.

As will be discussed later, some people that we interviewed who were affected by Irene commented on the lack of mental health services at the time of Irene. Many even suggest ways in which this discrepancy could be fixed such as promoting school counselors as community resources during times of need. This paradox, where the state did indeed provide services but many people did not know about them or take advantage of them, may be a product of miscalculations in temporal need, lack of advertisement in rural places, and general mistrust of government agencies.

Research on Emotional Health and Climate Change

Doherty and Clayton (2011) identified three classes of climate change impacts on mental health: direct, indirect and psychological. Direct effects describe the acute effects of extreme weather events, indirect effects encompass threats to health and related anxiety about the future, and psychological effects include chronic effects and forced adjustments. Tropical Storm Irene has the potential to impact Vermont communities in all three dimensions. The concrete impacts of flooding—such as property damage, unemployment, and financial loss—can trigger emotional consequences such as depression, stress, and anxiety (Tapsell et al. 2002, Otto et al. 2006). For

example, a study of the effects of a flood event in 2005 in Carlisle, UK observed long-term impacts to citizens' psychological processes (Carroll et al. 2008).

Washington County Mental Health Services frames these psychological effects in terms of three stages: the "Impact Phase," the "Recoil and Rescue Phase" and the "Recovery Phase" (Margaret Joyal). According to Washington County Mental Health Service's employee training materials, the Impact Phase, the time in which Irene initially hit Vermont, people may be stunned into inaction, may be disorganized, or may attempt to protect those around them ("Psychological Trauma"). During this phase people may feel helpless, dislocated, and threatened. In the Recoil and Rescue Phase, when the community began picking up the pieces of their lives, people may have felt numbness, denial, shock, grief, anger, despair, sadness, hopelessness, and even relief. The Recovery Phase is the last phase in which life returns to equilibrium. Depending on the extent of the disaster and personal trauma, it may take any length of time for this phase to begin. Often, this occurs after safety, emotional and psychological needs have been met.

Keeping in mind the temporal aspects of trauma as described by Washington County Mental Health Services, climate change impacts affect mental health directly, indirectly, and psychologically. This temporal and categorical scale provides for myriad combinations and experiences of mental health issues. In the face of climate change and natural disaster, the state should consider that both short-term and long-term effects of varying symptoms manifest in different ways and may be resolved on different time scales.

Existing Narratives of Tropical Storm Irene

Many others over the past three years have designed and implemented projects that allow Vermonters to share their stories. Beyond news stories and a handful of books about Irene (including one compiled by students in Rochester), the Vermont Folklife Center (based in Middlebury) partnered with organizations including the Rochester Historical Society to establish community-organized “story circles” in spring of 2012 as part of the larger Irene Storytelling Project. These story circles took place in Rochester, Mendon, Waterbury, Wilmington, and Athens, and other Vermont towns. Some of these reflections were recorded in a collection entitled “Weathering the Storm” produced by Aylie Baker for Vermont Folklife Center Media. “The only requirement of the story circle is that each person takes a seat in the circle. No questions are asked, rather, each person is invited to talk about whatever feels most relevant to them,” Baker says in the introduction to the audio piece. Over 250 people participated in these story circles. We listened to these and other archived recorded interviews at the Folklife Center to gain a better understanding of a larger collective narrative, and an *earlier* narrative when Irene was more raw for many Vermonters.

Jennifer Turk, an English teacher at Rochester High School, compiled a book of 9th–12th graders’ essays about their storm experiences that were written for the first writing assignment of the 2011-2012 school year. The book, titled *A River Ran Through It*, is a collection of personal and poignant “flood stories,” ranging from detailed documentations of students’ experiences to short summaries of their thoughts. David Goodman also edited a collection of stories and photographs of Waterbury’s experience of Irene entitled “When The River Rose: Stories of a Vermont Town’s Flood, Recovery, and Rebirth”, published by the Children’s Literacy Foundation. The proceeds went to benefit flood victims.

In the weeks and months following Irene, Rochester received a lot of media attention, both locally and nationally, that focused on both the shocking elements of disaster and the community's resilience (Figure 3). We were interested to see how people's personal narratives compared to this public narrative, three years later.



Figure 3. A collage of news headlines about Rochester, Vermont in the wake of Tropical Storm Irene (various news sources).

Methods

We began our study by designing a survey that aimed to capture the essence of the surveyed individual's emotional experience of Tropical Storm Irene during, immediately following, and three years after the storm (see Appendix A). The first seven questions of the survey ask about the individual's personal, property and monetary losses (or lack thereof), the experiences of their friends and neighbors, and their consequential emotional experience. The final questions, 8 and 9, ask about the emotions that they still experience as a consequence of Irene and whether they have prepared for similar disasters in the future. At the bottom of the survey we requested in-person interviews from those who were interested in sharing more of their story. We also included the option to fill in personal demographic data: gender, age, profession, and income.

Between October 21st and November 21st, we left hard copies of the survey with colorful posters asking for participation at five locations around town: the Town Clerk's office, the Rochester Café, Sandy's Books and Bakery, Randolph National Bank and the town laundromat. We also gave a package of 25 surveys to Rebecca Klein, the administrator for the Federated Church of Rochester, to hand out after church service on Sunday, November 2nd. After very little response to our survey methods (four respondents total), we posted the survey to Front Porch Forum, a free online forum to which members can post messages of all sorts to their community. We posted our survey to the Rochester area (including Granville, Bethel, and Hancock) Front Porch Forum network on October 14th and November 4th and received a total of 7 electronic survey responses. Facing low survey response rates, on November 4th we expanded our geographic range beyond Rochester and posted the survey to Waterbury and Rutland Front Porch

Forums. This was a turning point in our study because it broadened our inquiry to include a comparison of communities.

As the survey responses trickled in, we began conducting personal interviews. To start, we compiled a list of business owners, farmers, community leaders and residents that we found online and by word of mouth. Over the course of the study we called dozens of people from the Rochester community asking if they would speak to us regarding their experience of Tropical Storm Irene and their lasting thoughts on the matter today. As we spoke to community members, our list of contacts expanded with recommendations and referrals. During our interviews, we asked people a variety of questions, but we always began by asking them to tell their story of Irene. Some interviews touched on climate change, relationships to nature and community relations, while others stayed within the realms of physical and emotional experience. We also conducted supplemental interviews with professors of Middlebury College, professionals in the fields of public health and counseling, and individuals from outside the community who played a role in the orchestration of resources after Tropical Storm Irene.

The final steps in our process of story collection were our visits to the Rochester School, which serves grades K-12. With the support and help of Meg Allen and Lisa Blair, the administrative assistants, and Principal Cathy Knight, we were able to interview ten volunteer high school students, ages 14-16, and visit two elementary school class rooms—2nd and 3rd/4th grades—for group discussions.

Findings and Discussion

Survey Results

General Demographics and Irene Experiences

We received 34 survey responses: 5 paper responses from Rochester and 29 electronic responses completed on Front Porch Forum (from Rochester, Granville, Bethel, Hancock, Waterbury and Rutland areas). We conducted follow-up interviews with 4 of these respondents. While many survey respondents were brief in their responses, some were particularly unreserved and expansive in response to certain questions. However, for the purposes of identifying trends in the language reported in these surveys, we analyzed responses question-by-question, compressing these narratives into primary themes.

We received surveys primarily from older females. Although responses are distributed across 6 towns, the majority of our responses are from Waterbury and Rochester. While roughly a third of respondents live within an established floodplain, just under half of respondents experienced flooding. Respondents suffered a wide range of financial losses, ranging from none to a challenging amount (Table 1).

Respondents were prompted to describe the effects of Tropical Storm Irene first, on themselves and their immediate family, and second, their friends and neighbors. While they were not prompted to report effects of any particular directionality, there was a range of negative, positive, and neutral responses (Table 2).

The most commonly reported negative effects personally or on immediate family were flooding damage and property loss, emotional impact, and loss of place. One respondent wrote, “our house was trashed and our emotional well being was challenged.” Another respondent reported “we were displaced for over 3 months, living at friends, motels, etc.”. Only one

respondent cited a personal positive effect, writing it was a “difficult time...[but] it made my marriage stronger”. Two respondents claimed to have experienced no effects.

Table 1. General and flooding-related demographics of survey respondents.

General Demographics		
<i>Gender</i>		% of Respondents
	Male	23.5
	Female	76.5
<i>Age</i>		
	Range	32 – 79
	Average	57
	Median	59
<i>Town</i>		
	Bethel	2.9
	Granville	11.8
	Hancock	2.9
	Rochester	23.5
	Rutland	5.9
	Waterbury	52.9
Flooding Demographics		
<i>Location Relative to Floodplain</i>		
	In Floodplain	35.3
	Outside Floodplain	64.7
<i>Experienced Flooding?</i>		
	Yes	44.1
	No	55.9
<i>Financial Loss</i>		
	None	29.4
	A Little	20.6
	A Fair Amount	14.7
	A Lot	20.6
	A Challenging Amount	8.8

The most commonly reported negative effect on friends and neighbors was flooding damage and property loss. One female respondent described “extensive damage and loss of

property from flooding.” No respondents reported positive effects on friends and neighbors and only one respondent reported that all his friends and neighbors were largely unaffected.

Many respondents (51.5%) also referenced positive community impacts and developments, despite not being prompted to do so (Table 2). The most common community reference was the description of displays of—or increases in—community involvement. Respondents described relief work, collective efforts in town reorganization, and many incidences of community members that housed displaced friends and relatives. For example, a female respondent described her family’s “[concentration] on helping others [in the community].” Other respondents described increased “involvement in the community,” “time spent volunteering to shovel mud out of homes and help with the cleanup,” and “[gratefulness] for the volunteer response.” The second most common class of community references included pride in community strength and connectedness. Respondents described how response to the tragedy both demonstrated community closeness and further strengthened that existing community bond. One female respondent wrote, “I remember feeling...incredibly proud and energized by the people who did come together to volunteer and help in so many ways;” she concluded, “it was a very powerful experience to connect with the community in new ways.” The third class of community references was the description of community support. Respondents described their “gratitude for [their] amazing community” and the “outpour[ing] of support from friends and neighbors.” The fourth class of community references was the description of community resilience. Respondents described their pride in the community’s success and Vermont’s ability to “rise again.”

Furthermore, the first four major survey questions (related to flooding, personal loss, financial loss, and personal/immediate family effects) all pertained to personal experience;

however, 32.4% of respondents reported other's suffering as part of their response to these questions. Respondents referenced "sadness seeing the damage and losses people suffered," "good friends [who] lost homes," "grief for [their] town and neighbors," and displaced relatives.

Table 2. Distribution of effects at the level of 1) personal/immediate family, 2) friends/neighbors, and 3) community. At each level, effects are categorized as positive, negative, or neutral. Counts represent number of times such an effect was reported in the survey responses.

	Personal/Immediate Family			Friends/Neighbors			Community Reference	
<i>Negative</i>	Flooding damage/Property loss	8	<i>Negative</i>	Flooding damage/Property loss	14	<i>Positive</i>	Community involvement (relief working, housing friends, etc.)	8
	Emotional impact (stress, anxiety, helplessness, etc.)	8		Displacement/Loss of place	3		Community strength and connectedness	5
	Displacement/Loss of place	7		Financial stress	2		Community support	4
	Financial stress	5		Emotional impact (stress, anxiety, helplessness, etc.)	2		Community resilience	1
	Time cost/disruption of daily routine	5		Loss of retirement funds	1			
	Travel inconvenience	2		Isolation	1			
	Reduced real estate value	1	<i>Neutral</i>	None	1			
	Isolation	1						
	Loss of security	1						
	Pet loss	1						
<i>Positive</i>	Stronger marriage	1						
<i>Neutral</i>	None	2						

Emotional Impacts

Operationalizing emotions is difficult and simplifies complex human experiences, but it was necessary in order to see trends in emotional responses to Irene. Responses were placed in

one of four categories, “Positive,” including statements of gratitude and relief, “Negative,” including statements of anxiety and depression, “Mixed,” including statements referencing both positive and negative emotions, and “Neutral,” including statements of acceptance and no lasting emotional impact.

Respondents were then prompted to address their emotions during and immediately after Irene (Immediate Impact) and any lasting emotions they may experience (Lasting Impact). As anticipated, the self-reported emotions span a wide and nuanced spectrum (Table 3).

Negative emotional impact encompasses the greatest and most diverse response. Respondents most commonly reported fear, worry and anxiety, stress, and sadness. They reported “panic”, “nightmares”, “renewed anxiety during storms”, and “extreme sadness”. Two citizens who were not personally affected by the storm experienced guilt. A male respondent expressed that he feels forgotten: “I think the national news has not come back to see how resilient we Vermonters are...it appears VT and Irene were forgotten about”. In general, there was less negative emotion in the long-term.

Positive emotional impact encompassed a much less diverse set of responses; only three emotions were described. Respondents expressed “gratitude for their remarkable community”, and felt “grateful for the volunteer response” and “thankful for all [they] have [now]”. Many similarly listed relief as an immediate impact. Lastly, many respondents expressed pride. A female respondent stated, “I’m proud of how our town handled Irene”. Another respondent wrote that after the storm he “knew VT would, as it ever has, rise again”. Finally, a male respondent concluded his response with “we succeeded”. Unlike the negative emotional responses, most positive emotional responses (all except for relief) remained or even increased as lasting effects.

Table 3. Distribution of self-reported emotional responses to Irene during or directly after the storm (immediate impacts) and now (lasting impact). Emotions are generally categorized as negative, positive, or neutral. Counts represent number of respondents who reported experiencing the listed emotional response.

Negative		
	<i>Immediate</i>	<i>Lasting</i>
Fear	14	8
Worry Anxiety	12	7
Stress	10	4
Sadness	8	4
Trouble Sleeping	7	
Shock Disbelief	7	0
Regret	6	4
Anger	3	1
Anger	3	1
Guilt	2	0
Helplessness	2	0
Overwhelmed	2	0
Finance-related anxiety	1	3
Numbness	1	0
Frustration	1	0
Feels Forgotten	0	1

Positive		
	<i>Immediate</i>	<i>Lasting</i>
Gratitude	10	10
Relief	9	4
Pride	2	6

Neutral		
	<i>Immediate</i>	<i>Lasting</i>
Obliviousness	1	0
No Emotion	1	3
Acceptance	0	1
Dream-like	0	1

There were much fewer reports of neutral emotional responses. One respondent who was not personally affected by Irene wrote that during and immediately after the storm, he and his wife were oblivious to the destruction of the storm; they lived up on a hill and did not realize there had been severe damage until a few days after the event. Another respondent reported acceptance: “I have no lingering emotional problems...[because] I realize that I chose to live in a floodplain and [life] happens”. Lastly, a male respondent reported that the devastation now “feels like a dream”. Three respondents reported no lasting emotions, likely as a result of the 3-year time lapse since the event.

Respondents that referenced community (outlined in Table 2 as mention of community involvement, strength, support, or resilience) in their description of their Irene experience had in general, a more positive emotional recovery to the disaster (Figure 4). Those that referenced community in their response currently experience less lasting negative and mixed emotions than those that didn't reference community. Furthermore, those that referenced community reported experiencing more lasting positive and neutral emotions related to their Irene experience. An excerpt of one response exemplifies this relationship between a close-knit community and emotional recovery:

“My emotions [now] run to the positive. Neighbors and strangers came together to help anyone they could in any way they could. The sense of community, and caring for one's neighbors, including those we did not know before the storm, was a very heartening experience. Several local retailers (e.g., hardware stores) offered free or discounted flood-recovery merchandise, further strengthening the sense that we are all in this together.”

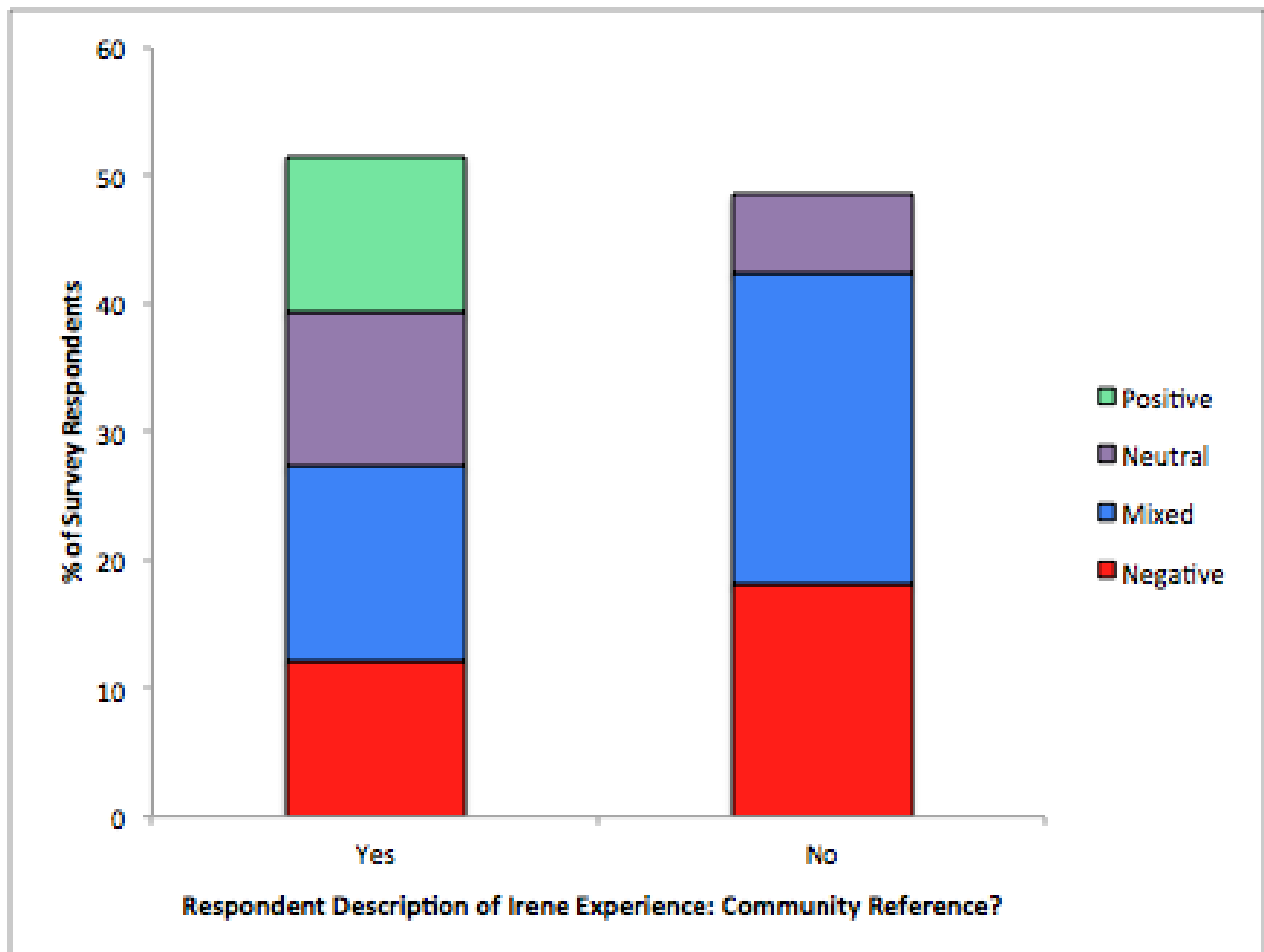


Figure 4. Percent of survey respondents that referenced **community** and percent of respondents that did not reference community. Total percentages are then broken down into distribution of **lasting emotional responses** of each grouping. Table 2 outlines what qualifies as a community reference. Table 3 outlines what qualifies as a neutral, positive, and negative emotional response. A mixed emotional response is characterized as a combination of negative and positive emotions.

Preventative Measures

Many respondents (58.8%) have taken preventative measures against flooding since Tropical Storm Irene. Reported preventative measures include reorganization of home (i.e., removing valuables from basement), flood insurance, infrastructure to prevent home from flooding, and practicing emergency response. The majority of respondents who experienced flooding have taken preventative measures. However, 11.7% of respondents that experienced flooding have still not taken preventative measures (Figure 5).

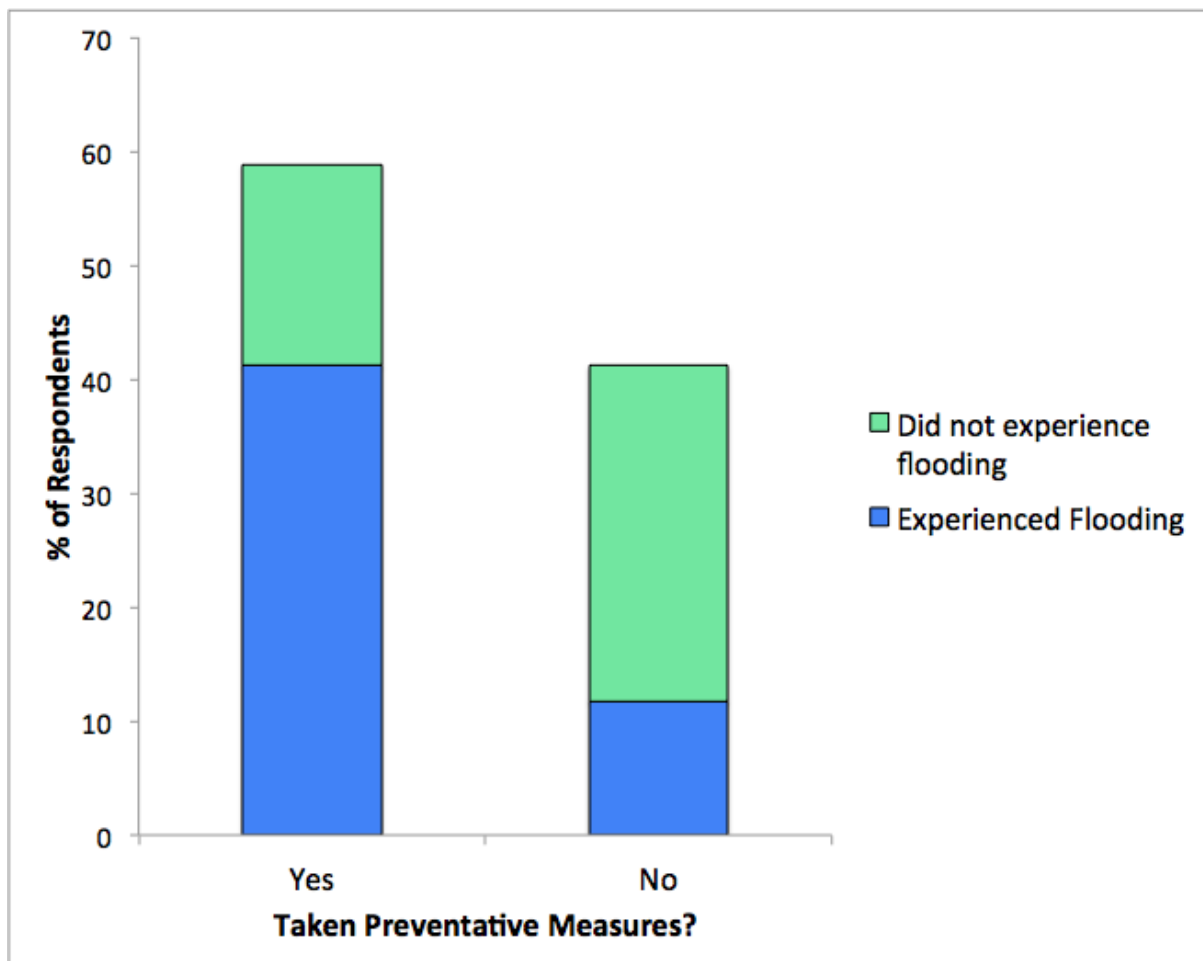


Figure 5. Whether respondents have taken preventative measures and within each grouping, percent who did and did not experience flooding.

General Conclusions from Surveys

The Importance of Community

None of our survey questions mentioned community. However, more than half of respondents referenced positive community impacts and developments. Roughly a third of respondents reported others' suffering as part of their description of their own experience of Irene. Citizens who suffered no direct personal losses from the storm reported feeling guilty rather than unaffected. Such unprompted allusion to the community suggests that community played a significant role in the Vermont experience of Irene. These Vermont towns collectively experienced Irene; both individual suffering and successes were shared.

Our analysis of the survey responses also suggests that such prevalence of community involvement, unity, support, and resilience softened the negative impact of the disaster. A significant portion of the positive emotional impact of Irene was related to community (i.e., gratitude and relief for community support, pride in community strength). Furthermore, those that reported community as part of their Irene experience (community involvement, strength, support, or resilience) generally suffer fewer lasting negative emotions from the disaster.

Thus, based on these findings, we recommend that future emergency preparation efforts emphasize building small support communities and establishing venues for greater community involvement.

Preventative Measures

Our analysis of survey responses also demonstrates that future emergency preparation efforts must place a greater emphasis on taking preventative measures. Almost half of survey respondents have not taken any preventative measures. Even some citizens who were directly affected by the storm have still not taken any preventative measures. Furthermore, preventative

adjustments that have been made are primarily limited to flood insurance and relatively inadequate home reorganization. Effective preventative action should be expanded to include establishing emergency plans and building infrastructure that prevents flooding.

Interview Results: A Discussion of Themes and Case Studies

In our interviews we heard over fifty voices from the Rochester community. We feel that presenting our findings from these interviews through raw voices embedded in our reflections allows for another dimension of understanding beyond the analysis of our survey results. In this section we discuss major themes that emerged from our many conversations. We have chosen to present four of these as case studies when we felt that an interviewee engaged us in a careful and rich discussion of many factors whose interplay we found especially striking as a standalone mini-narrative. In other instances, we share direct excerpts from other interviews in order to illuminate a given theme. We firmly believe in the durability and practicality of narrative and feel that our presentation of these voices allows for a complex and often realistically tangled portrait of emotional life among Rochester citizens three years after the devastation of Tropical Storm Irene.

Spectrum of Emotions, Three Years Later

In soliciting interviews and in the interviews themselves we witnessed a range of responses from no self-reported emotional response (at the time of the event and now, three years later) to extreme emotional response (again, both then and now). This is also what we saw with our survey respondents. The experience of the passage of time is a subtle but powerful force in the wake of disaster; as one teenage interviewee pointed out, “It felt like 10 years ago. And it felt like just yesterday.” In this regard, we were not surprised with the varied nature of eagerness on the part of Vermonters to engage with our project—some insist they as individuals or as a community have moved on in an attempt to return to normalcy, while others were still actively processing their emotions and had plenty to share with us. It seemed that this disinterest in some

cases was the result of people having told their Irene story again and again through storytelling projects, writing projects, or media interviews. One high school student mentioned off-camera that he'd "already done, like three of these movies." While Becky Klein of the Federated Church was eager to help disseminate our surveys, only one member of the congregation completed one. Some people were willing to talk but reported no emotional response to Irene. Many, however, readily share their stories with a fresh investment of emotion, and some point out that Tropical Storm Irene is "the elephant in the room" or is still present but only spoken about when people like us ask (personal communication). We cannot stress enough the significance of our finding that three years later many people still feel intense emotions when reflecting on Irene. Most of our interviewees would speak about how physical changes to the landscape, roads, or bridges triggered thoughts about Irene today. We feel this sound clip of multiple peoples' recorded voices represents this spectrum of emotions we encountered as people reflected on their experience: <https://www.youtube.com/watch?v=kvWEK4WWhwY#t=12>.

Climate Justice and Differential Impacts: Physical and Emotional

The narrative that developed around Vermonters' experience with Irene became defined by resourcefulness. This can be seen in the title alone of Peggy Shinn's *Deluge: Tropical Storm Irene, Vermont's Flash Floods, and How One Small State Saved Itself*. In her chapter "Vermont Ingenuity and Volunteerism," Shinn points out that "in the isolated towns, anyone with an excavator, bulldozer, backhoe, and tractor was helping to patch up and rebuild the washed-out roads - filling in breaches or creating detours. Where the chasms could not quickly be filled, resourceful Vermonters found other ways around" (2013). Our interviewees consistently talked about acts of resourcefulness and volunteerism to paint their picture of community resilience and

were proud of their self-reliance. One interviewee shared a funny account of National Guard responders showing up on four wheelers and the town members sitting around comfortably at a dinner they organized saying, “You want a rib? Come and have a rib!” Given that there are various ways to characterize resilience, we think our project is unique and valuable because it demands that we examine lack of resources and many kinds of vulnerabilities within the larger narrative of resourcefulness.

The particularly odd nature of flooding, as exacerbated by the complex geological lay of the Vermont land, is such that within a small geographic area some residents can have extreme to catastrophic loss of property while their neighbors down the road experience little to no destruction from flooding. Thus the very physical landscape has an effect on the severity of loss and thus can have an impact on the nature and severity of mental and emotional health impacts. Considering that the *experience* of a natural disaster is to some degree a socially managed phenomenon through which the community more or less, in the best case scenario, suffers as a unit, the varied degrees of material damage to individuals or families within Vermont is a critical factor in emotional and mental well-being during and after flooding. Of course, in addition to the nature of the impacts themselves, countless other factors will affect individuals’ responses to the impacts of natural disaster. Though Irene had disparate impacts within a small area, the storm was felt collectively. This was a common theme of our surveys and interviews, which we will address in greater detail later.

A natural disaster can also bring into greater relief underlying social injustices. Within the growing idea of natural disasters as socially constructed phenomena (where the ‘disaster’ is instead an environmental hazard) the disaster can be understood as resulting from existing vulnerabilities in human infrastructure which are the product of structural injustices (Wisner et

al. 2003). One narrative in particular from another project illustrates this theory in light of Irene. Rob Koier's film *Strength of the Storm*, produced by the Vermont Workers' Center, captures the travails of Vermont mobile home park residents in the wake of Irene. Mobile home owners could not afford the exorbitant fees of demolishing and removing their uninhabitable trailers from the parks, and the state government was not paying sufficient attention. On top of the fear induced by flooding itself, the frustration of poor communication between homeowners and the state was seen as an affront to these communities. Mobile home residents felt ignored by the state and other relief organizations because of their low socioeconomic status, and organized as the Mobile Home Park Residents for Equality and Fairness in order to protect their rights.

Although we did not collect socioeconomic information from our interviewees, many people spoke about financial struggles after Irene. One of our interviewees observed, "There's economic hardship in this town but it's very loving...the families are pretty solid. They might have hardships but their heart is in the right spot, which I think helps with trauma." This comment was a fairly representative one, capturing the sentiment most people seemed to have regarding the relationship between hardship (emotional or financial) and psychosocial support among members of their community. That said, as we think about climate justice, we must keep in mind how portraits of resilience can be colored by pre-existing vulnerabilities and variable access to the resources that may facilitate recovery efforts. Without diminishing the important narrative of self-reliance and community generosity with which many Vermonters defined their experience of recovery, it is imperative to consider how larger socioeconomic and health care structures address the differential impacts on vulnerable populations within Vermont. We will now briefly discuss a case study that demonstrates the frustration a teenager felt grappling with his family's financial burden in the midst of managing a complex spectrum of emotions.

Case Study 1: Ben (high school student): The Emotional Spectrum Within an Individual

We interviewed 16-year-old Ben at Rochester High School. Ben lost his home when it was flooded with eight feet of water. He spoke plainly and with admirable composure not just about his experience of the storm itself, but also about the management of his emotions in the following years. He was the only interviewee to (without prompting) share that he had addressed his emotional health through counseling, which he identified as beneficial in working through the pain after Irene: “It made me open up instead of bottling things up.”

Ben communicated the complex nature of time in the wake of trauma: “It’s funny that it was three years ago cause it feels like it was ten... and at the same time it feels like it was just yesterday.” While we generally prompted people to discuss their emotional well-being during the storm, just after, and in the moment of our interview, Ben traced together these points with a trajectory of personal change. “It’s almost like when it first happened – you didn’t wanna [sic] believe it. I didn’t think it was happening. I don’t get sad anymore [...] the worst of it’s over [...] when it first happened it was the end of the world.”

Ben’s approach to emotional health was as functional and nuanced as the engineering that helps to protect a physical environment from devastation in the event of a natural disaster. An earlier interviewee had used the phrase “elephant in the room” to explain the fact that Irene is no longer a significant topic of discussion in Rochester today. When we mentioned this to Ben, he responded: “I don’t think it’s the elephant in the room...I like to just set it aside, and be like, it’s over here [gesturing away from his body]. It’s like losing in a basketball game. Just because it sucks so bad doesn’t mean it’s going to defeat your whole season. You don’t dwell on one game.” His move to sequester painful memories of Irene and its aftermath did not look like suppression or denial in any way.

According to the BRACE report, self reported depression among youths nears the 20% mark among high school students (VDH 2013). This is a hugely significant statistic, and Ben openly spoke about his own experience with depression after Irene: “I was depressed for a while. Just cause I didn’t show it [...] I tried to be happy. I was a happy guy—still am. But there’s just always that fact in the back of your head. You’re always thinking about it *somewhere*. Even when you’re not thinking about it, it’s always there.”

Ben was one of two high school students with whom we spoke who lost their homes. The emotional maturity they both displayed was remarkable, but at the same time, they spoke of their frustration with having to navigate logistical hurdles even adults find infuriating or unjust. Both spoke of the frustrations of dealing with FEMA or their banks in the rebuilding or relocating process. Thus, a traumatic weather event and the logistical maneuverings required to gain a sense of stability in its aftermath may propel a child prematurely into a situation he or she should not have to navigate. On top of the trauma, having to help their parents deal with these adult responsibilities in the years after the immediate crises have abated could lead to compounded frustration, such as that which Ben experienced, that could fuel negative consequences for emotional and mental health.

Case Study 2: Elementary Students Share Their Stories

On a brisk November morning a couple of us spoke with a combined third and fourth grade classroom at Rochester School. We identified five primary findings that speak to the unique and often valuable way in which children of this age process natural disasters like Irene. First, these students were the only people with whom we spoke who explicitly and without prompting spoke about lives lost. While no human lives were lost in Rochester, animals did

suffer and some died. One girl mentioned the death of her pet ferret; others talked about chickens and other pets that drowned in flooded basements.

This was illustrative of another finding, which was that these students reflected on Irene largely through memories of concern for others, whether animal or human. First, there was the sense of Irene as a communal experience (we will address second graders' eagerness to participate in a collective story in a following section): "I think that everybody was so really frightened," said one girl. "It's kinda fun. . . but at the same time you think of everybody else and what's actually happening," one boy offered. A peer responded to this by saying, "For me it was fun because I live on a hill and nothing happened, but I thought about some other people. . . like someone's driveway got split completely in half." Many talked about their personal experience at the time of Irene in terms of their fear for family members who risked their safety, and mentioned feeling relief and happiness when their family members returned.

Our next finding is that most children expressed in plain terms an overall impression we had been getting from interviewing adults, which is that the full range of nuanced emotions was experienced by individuals and on a larger scale as a community. Children readily acknowledged there was fun in the novelty, thrill, and adventure of the natural disaster while feeling true fear and sympathy for others at the same time. For example, one girl said, "I just looked down [over the bridge] and I was just scared to fall. But I also wanted to jump in the water real badly. . . ."

We also found that these children had impressive capabilities of complex self-reflection on their emotional wellbeing over time. When we asked how many people thought about Irene when they saw water now, about half said yes and half said no. We also asked about how it felt three years later to reflect on Irene. Here are some especially compelling voices from four different students:

- Student 1: “When the actual storm happened, it didn’t feel too scary, but now when I *talk* about it, it feels really scary.”
- Interviewer: “When you think about it now, do you feel scared again?”
Student 2: “Yes, I feel a little bit scared that it’s gonna [sic] happen again and I just hope that it doesn’t.”
- Student 3: “I was, um, really scared when. . . that whole year when Irene happened and, um, the next two years I started calming down about it and then, now talking about it is making me think of how I felt and how scared everybody might have been.”
- Student 4: “I don’t think about Irene at all now, but now that you brought it up, I’m having like a flashback of what happened and stuff—imagining what, visualizing what happened in my mind.”

We appreciated these honest reflections on what it was like to revisit a potentially traumatic event. While we are in no position to make claims about whether or not child or adult minds are actively working to suppress the experience of Irene, we feel these voices are illustrative of the power of memory even three years later.

Our final finding is that these children spoke about community resilience in terms more evocatively concrete than what the term “resilience” usually calls to mind; specifically, a couple students mentioned how the collective recovery effort after Irene facilitated community building. Here are two examples:

- “What I was happy about after the flood—my dad discovered Liberty Hill Farm. . . we had just moved here. What happened was, after the flood we wanted to know who lived there and we wanted to ask if they were okay because they had that big river near the bridge. . . We met the Kennetts at Liberty Hill and we noticed how nice they were and we became friends.”
- “I got to actually see my neighbor a lot more. He was old, he passed away recently. . . Every day my mom would make soup and I’d ride my mountain bike down and...I’d give him the soup. . . every time I just sat there and he just was watching the football games, every time, *every* time I came down. So now I know what he liked.”

This day of interviews was a particularly inspiring one and it was encouraging to see how classmates worked together to help one another recall and communicate this complex range of emotions as they built a story of Irene as a class. Their memories were beautifully concrete and

grounded in both the senses and personal relationships and were managed with a refreshingly honest and at times analytical self-reflection.

Imaginative Resilience of Children

We interviewed a second grade class (as one large group) at Rochester School about their experience of Irene. First, we found that children were eager to share in the collective story of Tropical Storm Irene. In one case a young boy began his story of the flooding and only stopped when the teacher pointed out that he wasn't living here at the time. It was clear that he wanted to share this memory in the context of the larger narrative: "I know. I'm imagining of another storm." (Keep in mind, these children were about four years old in 2011). Like the third and fourth graders, they acknowledged that their experience was both fun and frightening. It was "fun because I got to be outside in the rain," and it was fun because of the novelty of the situation (e.g., having to take snowmobile trails).

We asked these students to share their favorite place in nature and then asked how they would *feel* if something bad happened to this place. While a couple students speculated about negative emotions, most spoke in terms of what they would *do*: "I would just find another place," "I would choose a different tree," "just go to another pond," and "I'd pick a different Silver Lake." We found this particular variety of innocent but confident resilience especially inspiring. Faced with compounding climate change despair, the voices of young children are crucial because of their grounding in imagination and hopefulness, no matter how naive. These responses were also encouraging because they demonstrate how, for the most part, these children jumped right into the action they would take when faced with loss. Current and future climate change consequences will demand intergenerational dialogue, and based on this conversation we would recommend that people not shy away from discussing environmental degradation with

children, even if they are concerned about the frightening emotions these conversations will likely evoke. The speculative and measured words of one young girl sums up the sadness of loss of place and the determination to be innovative in creating new spaces: “If ever the river stops flowing, I don’t know what we would do anywhere else. It’s hard to get into other places when there’s crowds. . . I would feel awful. If I had nothing else to do, I would just go to Laila’s house and play with her.” While we recognize that environmental education should be and is naturally based in wonder and exploration, especially at this age, we feel that these students’ innocent perspective of the outdoors as abundant and infinite, expressions of practical ingenuity when faced with a loss of natural place, and natural impulse to be a part of the collective story will prove a hopeful and indispensable voice in despair-heavy conversations about how the effects of climate change play out on global and local scales.

Trauma and Recovery

In our attempt to document emotions three years after the flooding, we recognize that Irene can be understood as a potentially traumatic event, while keeping in mind that this was a traumatic experience for some, but not for others. Margaret Joyal defines a traumatic event as “any event that *we* believe is life-threatening to us, it doesn’t objectively have to be life-threatening.” Middlebury psychology professor Matthew Kimble, who studies combat veterans with posttraumatic stress disorder, glossed a meta analysis of PTSD studies that found that the degree of social support an individual receives in the wake of a disaster has more influence on whether or not a person develops post-traumatic stress disorder than does the severity of the potentially traumatic event itself (Brewin et al.). Joyal made it clear that the most critical time is the aftermath of a disaster: “People get traumatized and then you’re not talking about a single

episode of trauma . . . mostly . . . it wasn't the single episode, it's what happened afterwards...what happens afterward to the victim has everything to do with how that person is going to recover." From these two points we can see that the degree of social support an individual feels *after* the natural disaster is crucial in how people manage or do not manage the emotions that stem from or are exacerbated by the event.

Joyal's comments on trauma also point back to our discussion of socioeconomic justice. Joyal spoke to this too, saying, "Katrina is a great example of what goes wrong post a disaster. People who were poor who were already vulnerable, at the Super Dome with no security, no water, and no plan, no way to get out, there was no plan to transport them out – so the system around them re-traumatized them and continued that trauma." These words demonstrate how existing vulnerabilities to posttraumatic stress can be exacerbated and perpetuated by systemic problems.

What about children? In her report to the Vermont Agency of Human Services on psychological trauma in children and adolescents, social worker Kathleen Moroz includes "severe natural disaster, such as a flood" in her list of traumatic incidents (Moroz). She defines posttraumatic stress as "traumatic stress that persists after a traumatic incident has ended and continues to affect a child's capacity to function" (Moroz). One of our interviewees who works daily with children observed that children did not typically discuss Irene unless prompted to. She was careful to add, "If they're only six or eight years old, you don't necessarily see the trauma until later, possibly."

We asked berry farmer Rob Meadows if he would consider something like the havoc wreaked by an invasive parasitic species to be a natural disaster. While he reserved this term for catastrophic weather events, he did identify this climate change threat as a "calamity" caused by

the forces of climate change and globalization. We asked Professor Kimble a similar question about defining trauma. If a trauma is identified as that which someone identifies as threatening to their “physical integrity,” must a traumatic event be as sudden as a storm? Is it possible for trauma to become commonplace in a changing climate? In thinking about displacement, the term “solastalgia” is now used to describe how “environmental degradation . . . can change a loved home to the point where the psychological impacts are similar to leaving that home” (BRACE Report 73). Considering those, like farmers, whose physical integrity and economic security are more inextricably tied to the land, we might be entering a phase of human history when the clinical language of mental health is increasing in direct proportion to increasing catastrophic weather events as we are called to develop new names for new emotional phenomena.

Case Study 3: Sue Johansen and Family

We conducted a phone interview with Sue Johansen, a Waterbury resident and clinical dietitian who volunteered to speak with us after taking our online survey. Two important themes emerge from her story: that the impact on an individual’s emotional wellbeing and mental health are heavily influenced by what they witness their loved ones experience (within the collective experience) and that, while the flooding caused by Irene itself was potentially traumatic, much if not most of the impact is determined by the nature of the recovery. Most of Sue’s story was about the emotions that came along with cleaning up for weeks after the flooding. She also spoke of the pride she felt in Waterbury’s *response* to the devastating floods. Drawing on Wisner’s aforementioned theory of the natural disaster itself being determined by the existing infrastructure, we can think in terms of existing social infrastructure. Though her experience was

not necessarily traumatic, her focus on the community and the recovery and cleanup also illustrates the importance of social support following a catastrophic weather event.

Most of the negative emotions Sue experienced stemmed from watching her five-year-old grandson cope with his own emotions in the weeks after Irene. One of the most compelling parts of this story was how her grandson's behavior reflected the difficulty of articulating and processing tangled emotions in the wake of natural disaster. Sue pointed out that he began to insist that his clothes did not fit: "Nothing fit. His underwear didn't fit, his socks didn't fit. . . his jeans. . . He would just say 'I can't wear that, it doesn't fit'. . . His world was not fitting." His parents were spending much of their energy cleaning the muck out of their home, so this added significant stress to his life. Sue said that she felt the Waterbury community could have used the support of a "community psychologist" in the days, weeks, and months following Irene.

Connectivity: Local, National and Global

We saw elementary students speaking about becoming closer to their neighbors as an encouraging illustration of how empathy begins to operate on a local scale. We were also interested in whether or not peoples' flood experiences affected the way they relate to strangers in other parts of the country or world who also survive natural disasters.

Among high school students, many explained that their empathy and concern for the effects of climate change on people across the country has heightened as a result of their experience with Tropical Storm Irene. In regards to climate change, one student said, "I sympathize more. I get more worried..." Another student lamented over the climate and landscape changing in a place far from his home: "Like in California there are massive wildfires [. . .] there's a reason for that: climate's changing. It's not what it used to be."

Ben, a 16-year-old high schooler, described how his perception changed in regards to the reality and the severity of natural disasters across the globe. He said, “You see it on the news of people all over the world, this happens all the time, and you don’t think anything of it until you’re a part of the situation. Then it happens and you’re like, okay, this is for real. This isn’t a joke [...] You really realize what you take for granted” (Ben). Meg Allen also felt the weight of devastation in other parts of the world. With great sympathy in her voice she said, “It’s also made us mindful about what’s happening everywhere. In Africa now with Ebola, all these children being devastated: the adults in their lives are just *gone*, homes are *gone* in Iraq. . .” (Meg Allen).

These examples of people feeling empathy for others outside of their own community highlights the broader idea that with trauma and adversity can come an understanding of the world’s interconnectedness. Cathy Clarke explained it well when she said, “I don’t think there’s any haven in the United States that you could actually isolate and say ‘I’ll live here and I’m not gonna be influenced [by climate change]’” (Cathy Clarke). Although what Cathy describes seems basic and logical, we would purport that her understanding of this interconnectedness is greater than the average American’s.

Another interviewee, Rob Meadows, brought climate justice into this global awareness, saying, “The people who are suffering from the effects of global warming are not the people who caused it for the most part. They’re people living in poor countries in low sea level areas. . . in Bangladesh, and the Maldives” (Rob Meadows). Rob’s emphasis on the how climate change effects unequally impact people around the world is further evidence of this understanding of connectivity.

Case Study 4: Berry Farmer Rob Meadows

One of our early interviews was with Rob Meadows, who along with his wife Patricia runs Sunshine Valley Organic Berry Farm in Rochester. They have lived in Rochester for fourteen years. Other than business lost in the days after the storm, Rob and his wife did not suffer much loss. Nonetheless, they were very involved with recovery efforts. A dominant theme in his story was his pride in the Rochester community for their response to the devastation of Irene.

Rob articulated frustration with those who were “making it [be] about control.” In this sense, these words are indicative of concern with the *tone* of how law enforcement and larger organizational powers dealt with the aftermath. Control, he pointed out, “wasn’t as helpful as marshaling energies of everybody to cooperate. Order comes from cooperation, not merely from the application of control.” Rob had a clear sense of what allowed Rochester to demonstrate community resilience. In aligning the ability of Rochester to recover with a state of peace, he shared that his “formula” for peace was the combination of tolerance and cooperation. “A town’s as good as its people are tolerant,” he said. In fact, Rochester’s response to Irene in some ways validated the strength he saw in his community: “It made me feel like it was a sensible place to live.” Tolerance was also important to him because he saw it as necessary to “stay in the room” when faced with conflict. Though devastating circumstances, the experience of Tropical Storm Irene by isolating the town, effectively ensuring people stayed in the room, so to speak, gave people the opportunity to demonstrate and develop their tolerance. “I think Rochester’s got good doses of cooperation and good doses of tolerance, and if you have those two, it’s more peaceful. That’s the formula. And I feel fairly confident that if we had another mess here we’d probably respond even quicker. . . if it came within human memory of Irene . . .” he offered. Rob

embedded these ideas in a larger national, and even historical narrative. An Australian native, Rob spoke at length about how his experience of this particular natural disaster fit within what he values in American culture: “In fact, tolerance is what characterizes New England.” Rob saw this small-town American lifestyle based in tolerance and cooperation as uniquely important for physical and emotional recovery from natural disasters.

Finally, Rob’s approach to the notion of emotional resources as one mechanism of community strength was especially powerful. In his discussion of the success of Rochester in recovering from Irene, Rob spoke as if emotional strength were drawn from pooled restorative energy, saying that “your pain today is my pain tomorrow.” He spoke of one particular incident in which a community member was angry about how his damaged house had been robbed while he was waiting for FEMA to inspect it. Rob remembered that at the town meeting “that gentleman was shakingly angry...the community has to absorb that for him...I felt that the communities needed to...suffer through, if you like, that person’s frustration.” We feel that with these words he articulated a general sentiment of Rochester residents that the collective suffering mitigated individual emotional burdens.

Feeling Forgotten

Despite hearing a fairly consistent narrative of community cooperation and unity in our many interviews, some people that we spoke with still expressed feelings of abandonment and alienation. These feeling of abandonment were at multiple scales: both within the Rochester community and at a national level.

A couple of the residents of Rochester that we spoke to recognized that, while the community was relatively successful at managing the crisis, in Rob Meadow’s words, it was “not

perfect” (Rob Meadows). Ladybelle McFarlin, a resident of Quarry Hill, a community within the town of Rochester that is slightly isolated on a hill outside of town, described feeling “abandonment” and “desolation” in the days following the storm. When we interviewed her in home at Quarry Hill, she read us an excerpt from her journal, recorded at the time of the storm. In August 29, 2011, she wrote:

Heavy rains, sound of boulders like teeth of giants. I felt no one remembered or cared whether we were OK. I felt very desolate on Sunday night...Wondered if Vermont friends in parts not as badly hit would call, but they didn't...Brian insisted on going down the hill to Hancock; I wondered if I'd ever see him again.

(Ladybelle McFarlin)

At the time that Ladybelle wrote this journal entry, Quarry Hill was completely isolated because the roads down to Hancock and Rochester were washed away. Her husband, Brian, along with another man from the small community, managed to walk to town the day after the storm, but overall, the people of Quarry Hill had little to no contact with the residents of Rochester that lived closer to town, until three days after the storm (Ladybelle McFarlin). Ladybelle said, “There was this feeling of ‘Wow, we could die up here and nobody would care’” in response to their isolation, lack of communication, and alienation from other people (Ladybelle McFarlin). At the same time, she understood that the nature of their distance from the center of town meant that it would be “our problem to look after ourselves until they got to the stage where they could think about the needs of people in farther outlying circles” (Ladybelle McFarlin). To this day, her thoughts appear to oscillate between feeling that her community was abandoned and understanding the geographic limitations of aid at the time.

Ladybelle’s recounting of the relationship between Quarry Hill residents and the rest of Rochester reflects the inherent impact that the landscape has on emergency communication and crisis management in times of natural disaster. Her story also highlights how existing social and community structures, that are unapparent or taken for granted during times of peace, become

heightened, vital, and more impactful during times of crisis. Although Ladybelle says that the Quarry Hill community has “blended fairly well” with the town of Rochester over the years, she still felt excluded—both physically and socially—from the effort that the Rochester community put forth to collectively care for itself (Ladybelle McFarlin). Ladybelle said that she offered to take a shift at the clerk’s office answering the phone and handling personal crises, but was told that she wasn’t needed. She thought, “maybe it’s because I’m from Quarry Hill,” but ultimately she wasn’t sure and was just disappointed that she couldn’t be more helpful (Ladybelle McFarlin).

Ladybelle’s narrative reminds us of the varying degrees of connection that residents of the same town can feel towards a larger community, and her story gives us an idea of how physical distance from the town center can be scary. The Quarry Hill community was about 35 people at the time of Tropical Storm Irene, and while they managed to take care of each other until they were able to connect back to town, Ladybelle’s description of her desolate fear suggests that she felt vulnerable and disconnected from a protective community.

This feeling of abandonment also extended to a national scale in many of the interviews that we conducted. When many people spoke about climate change, both when prompted and when the topic came about naturally in our conversations, many people expressed anxiety over whether American politicians were taking care of their citizens in the face of global warming. Michael, a high schooler from Rochester, said that the idea of climate change stresses him out “quite a bit” because he feels that “politicians aren’t doing anything” (Michael). Cathy Clarke, the drivers’ education instructor at Rochester High School, shared a similar concern for climate change politics: “It’ll be interesting because incidents cost money and that’s the only thing that politicians might notice. . . I don’t think ‘til that registers that they will realize there’s something

different” (Cathy Clarke). The anxiety that Michael and Cathy express over feeling that the safety of the country is not being handled properly parallels Ladybelle’s feeling of separation from the happenings of the town of Rochester after the storm. In both cases, this feeling of insecurity and isolation made people’s experiences more stressful.

Exacerbating Existing Stresses

As our survey results demonstrate, anxiety was a frequently encountered emotion when people described their experience with Irene. In his presentation on climate change and public health to our class this fall, David Grass made it clear that the effects of climate change exacerbate existing health stressors with three points: the effects will 1) “add to cumulative stresses faced by vulnerable populations,” 2) be potentially worse in “locations (cities, floodplains, coastlines) vulnerable to extreme events/ongoing, persistent climate-related threats” and 3) lead to the “increasingly devastating accumulation of stresses to these populations over time” (personal communication). Our interview findings certainly reflect these points.

While Irene introduced new challenges specific to coping with flooding as a potentially traumatic event, in many cases people pointed out that the destruction wrought by Irene exacerbated existing stresses, such as flooding following on the heels of a loved one’s battle with cancer, a family’s already difficult financial situation, or even an already weakened physical condition. One respondent, for example, included “loss of cartilage in [her] knees from lifting heavy wheelbarrows full of gravel [which flooding had deposited in her yard]” among her losses suffered in the aftermath of Irene. A teenage interviewee shared, “My parents got divorced. I think definitely [. . .] the flood had something to do with it because it really stressed the whole family out.” These are only two examples in a long list of possible pre-existing stressors and

vulnerabilities that includes, but is not limited to, mental and emotional health challenges, geographic vulnerabilities, relationship and family challenges, adjustments to a new home or social group, and financial distress. The degree and type of support an individual or family does or does not receive can alleviate or exacerbate these pre-existing stressors in any number of unpredictable ways.

Climate Change and Framing

In many of our interviews (though not in our surveys) we asked people if they understood their experience of Tropical Storm Irene to be related to or caused by climate change. We received a range of responses, from uncertainty of Irene's place in the climate change discussion to recognition of global weather patterns changing and Irene being representation of that climatic shift. These quotes exemplify some of these perspectives:

- “Weather’s definitely changing. Irene seems to be evidence of that, although you never know, it might’ve been an odd thing.” (Rob Meadows, farmer)
- “It’s frustrating to me that educated adults don’t see it and continue to deny it [. . .] [adults will say] ‘It’s happened before, evolution is just a cycle,’ but I feel strongly the cycle’s more extreme than it was [. . .] I don’t think they’re gonna [sic] change their thought process until it affects them personally [. . .] when it starts hitting your wallet.” Speaking about the knowledge of farmers: “[Irene] came in September, the floods are usually in March after the snow” (Cathy Clarke, physical education and drivers education instructor)
- “I don’t think about [a future storm] regularly, but it’s often proved that certain events happen again. Think of it this way: we always have some kind of war going on in some culture or another [. . .] I think that [. . .] unnatural disasters are the same. Mother Nature doesn’t make any exceptions for anybody really. Just think of Hurricane Alley” (Cody, high school student)
- “It’s possible that it could be something to do with climate change, but I don’t think about it too much cause I didn’t get affected too much . . .” (Wesley, high school student)
- “It probably rained so much because—isn’t it like, rain is from dust in the clouds or something?—we had a really dry summer that year, so that could have something to do with it. But I don’t think it has anything to do with climate change, definitely, cause we

wouldn't be affected by like the ice caps melting or whatever.” (Daniel, high school student and hunter)

- “I think that humans build themselves up and make it seem like we're like this huge force that has an impact on the world but then something like this happens and you realize that we don't really have any impact at all, and that we're just a really small speck.” (Chloe, high school student)

Cody: “And then there's the other perspective where we are creating an impact but it's a negative one with things like global warming, the oil spill a few years ago.”

Chloe: “Yeah, exactly.”

At the same time that he denied connection between melting polar ice and Irene, Daniel and his two friends spoke about noticeable changes after the storm. They talked about there being fewer deer, the fact that “fishing went down,” and mentioned that “all the rivers are different now.” When we asked if they thought the river would recover, Daniel answered “Eventually. . . but I've gotten used to it.” We also spoke with high school students Wesley and Liana about climate change and Irene. Liana shared an important distinction between coping with the emotions of a natural disaster and speculating about its causes: “Tragedy-wise, I don't really think about climate change. But, when people bring it up [. . .] both of us are in an environmental studies class this year and we definitely talk about it, and it all comes back to ‘was Irene part of that?’ — and I definitely do think about that sometimes.” Wesley spoke of a class project where he and another student developed a plan to make Rochester powered by sustainable energy: “We've come up with a lot of different things. We've found out how much energy we use [. . .] and we found that a small-scale biodigester [. . .] could produce all of Rochester's energy, plus some. It's amazing to think about what you can do if you put your mind to something.” It seems, then, that students are finding practical and personal applications of their high school environmental science classes. However, Daniel and his friends' acceptance of local environmental degradation illustrates that there is still a need to think creatively about how to create spaces where people can embed their personal stories and observations (especially those

about outdoor hobbies like fishing and hunting) into the climate change science they learn about in school.

The narrative around anthropogenic climate change and the place of natural disasters within it is a highly politicized one. Data suggests that framing the threats of climate change in terms of threats to public health may be a more effective method of bringing skeptics into the conversation and demonstrating the ubiquity of climate change's consequences (Myers et al. 2012). Mental and emotional health is a critical and often overlooked piece of public health, let alone the lack of information about the relationship between mental health and climate change. While still keeping in mind the experience of a natural disaster is politically mediated and socially managed often to the disadvantage of vulnerable groups, demonstrating how concerns for emotional well-being (on multiple scales) and threats to lifestyle (such as hunting and other hobbies) will likely prove fundamental to depoliticizing climate change rhetoric. This could happen in many domains, including innovative education curricula, the arts, communication materials developed by public health agencies, and any other number of initiatives, which encourage people to relate their personal experiences with the natural world to what they know about climate change. It is important to reemphasize Liana's point that climate change did not seem relevant "tragedy-wise." If there is a disjuncture between learning about climate change and emotionally managing a tragic natural disaster, we must critically ask why this is the case and identify areas where we can begin to bridge this gap. Our wide range of interviewee comments about climate change and Irene indicate the importance of creating spaces where people can talk about their personal stories in conversations facilitated by those able to communicate their knowledge of climate change, and more specifically their knowledge about the relationship between mental health and the consequences of climate change.

Power of Collective Suffering

In her book on environmental despair, Joanna Macy, an environmental activist and scholar, describes a phenomenon that she calls “collective suffering”: the fear and empathy for “what [will happen] to others, to human life and fellow species, to the heritage we share, to the unborn generations to come, and to our blue-green planet itself” (Macy 241). From the voices we heard in Rochester and the surrounding communities, it has become clear to us that Macy’s idea of “collective suffering” can apply, not only to the great sufferings of humankind (and other living beings), but also, to the healing process of a tight-knit community. In our study, people, both seriously affected and less affected by the storm, described feeling great sorrow and compassion for the losses of their neighbors and friends.

In addition to describing feeling the pain of a community, we believe that “collective suffering” can also speak to experiencing the pain and suffering of a place. Ladybelle McFarlin spoke to us frankly about her observations of her home, Vermont, changing over her lifetime. She said,

The Earth is not the same as it was when I was a kid 50 years ago, at all...It was serene . . . There’s a difference in the way the sun feels now when it’s out in Vermont than it did then. It’s hot. It burns. It’s really intense . . . I wish it could be the way it was in 1950 in Vermont ...And I don’t think it will ever be that way again.

(Ladybelle McFarlin)

Ladybelle expressed immense grief over the changes she is witnessing to her sense of place. This form of sorrow is another avenue that we believe calls for further study.

Because we have presented many narratives that speak to the phenomenon of collective suffering in this discussion of our findings, we feel it is important to acknowledge the limitations on our language’s ability to truly describe what grief, loss and sorrow feel like, especially in regards to empathizing with others. Recalling what it was like to see Rochester washed out and so many families’ homes destroyed, Meg Allen, an administrator at Rochester High School, stumbled to describe her emotional experience to us, and then conceded, “I don’t know that we really have good

language for it” (Meg Allen). Macy agrees that we do not have adequate words to articulate our feelings because the words that we often use (despair, loss, fear, rage, helplessness, etc.) describe “personal suffering” or a personal sense of mortality, which only encompasses part of what we feel (Macy 241). Out of respect to our interviewees, we would like to remind our readers that words are merely boxes that we must fit complex tangles of emotion inside of, and for many people, words do not articulate their full experience.

For the first time in human history, no matter our beliefs or politics, we have lost the certainty that future generations will “walk the same Earth, under the same sky” (Macy 241). The inability to envision what the Earth will look like for our future children is disturbing and terrifying, and not nearly enough studies have been done on the psychological effects of this realization.

Macy said, “To suffer on behalf of the larger society...is real, valid, and healthy” (Macy 243). From our study of the aftermath of Tropical Storm Irene on Rochester, we found that the resilience and empathy of the community, which goes along with collective suffering, was a powerful catalyst for emotional recovery. Although the fear, loss, and sorrow that came out of Tropical Storm Irene will most likely remain in the minds of those who were affected for years to come, we feel confident that the emotional health of the community will continue to improve because its residents take care of one another. Rochester exemplifies the incredible power of a close-knit community to bolster the emotional resilience of its members.

Recommendations and Conclusions

Recommendations

The testimonies shared through survey responses and interviews with Vermont residents offer a complex and encouraging picture of communities attempting to resume their normal daily lives in the aftermath of a major flood event. The people of Rochester showed an immense amount of resilience, pride, and unity during the flood event that allowed them to adapt to the chaotic aftermath of the storm and to begin to rebuild quickly.

Rochester's small size played a key role in their ability to cooperate and help one another emotionally through the aftermath of Irene. For example, one of our interviewees mentioned the importance of the town green as a meeting space when communication was difficult or impossible in the days after Irene. Another interviewee spoke of her pride watching the "resiliency and creativity" of a soccer team practicing on the park in town where the coach was "mindful of the players' tender emotions." We believe that, for our interviewees, seeing other people work within this small geography allowed them to speak to the closeness of the town.

Fostering small-scale community resilience in larger Vermont communities and making sure recovery efforts and aid distribution occur on very local scales can help manage emotional impacts. This could potentially be done by working to identify close knit neighborhoods and targeting resource distribution at that scale, thus allowing aid from outside the community in any form to feel more personalized. This could simply involve building partnerships with existing organizations that promote community building before disaster strikes. One initiative might be to offer recreational classes in emergency preparedness.

Keeping in mind the earlier message from the BRACE report about the lack of information on the relationship between climate change threats and mental health impacts, as

well as the wide spectrum of emotions expressed by our interviewees, even three years later, we call for more studies that target specific pieces of emotional wellbeing and mental health as they relate to environmental degradation. These studies must involve both those who consider themselves generally emotionally healthy and those who already struggle with mental and emotional challenges.

Some published studies estimate that about 25% of all U.S. adults have a mental illness and that nearly 50% of U.S. adults will develop at least one mental illness during their lifetime (CDC 2002 cited in BRACE report). In identifying vulnerable subpopulations, research that studies the effects of natural disaster on those with diagnosed mental health conditions will prove crucial in creating support networks. As Margaret Joyal told us, “the people who are the most vulnerable post-disaster are people who already have mental health concerns.” These studies will need to range from researching how the experience of a natural disaster or the knowledge of climate change affects those with severe generalized anxiety to working with people who are struggling with PTSD, including but not limited to combat veterans and emergency response workers.

Both for those who identify as emotionally healthy and those who struggle with existing mental health challenges, we can see how studies of very specific connections between mental health and climate change will be increasingly called upon to understand emotions that are taking new forms, such as solastalgia, or are compounding in unforeseen ways (BRACE report 73). Psychologists and mental health experts could look to literature and the arts for this specificity. Vermont’s Approach to Health Promotion and Disease Prevention is a model demonstrating the importance of the dynamics between different scales of operation from the individual up to policies and systems (David Grass, personal communication). Our success in drawing our

portraits of these specific emotions was dependent on making connections with individuals and working with organizations. Keeping in mind the efficacy of working on this scale and that artistic expression for many is a way of coping with mental and emotional struggles, The VDH could consider innovative collaborations with Vermont literary presses, for example, in order to facilitate connections between the individual, relationship, organization, and community scales of the Health Promotion and Disease Prevention Model.

As we already mentioned, although the state offered counseling services to Vermonters after Irene, they were not really utilized. On its E-Ready webpage the Vermont Department of Health includes “vital partnerships among responding agencies and organizations” (2014). Based on our findings, these partnerships will be increasingly crucial as people gravitate towards different organizations for various kinds of support. Keeping in mind the stigma around mental health and government agencies, the VDH could identify and support trusted community members and existing organizations that offer material and emotional support, including counseling. Having had success using Front Porch Forum, we would also recommend distributing online surveys asking people directly where they would seek emotional and mental health support after a natural disaster. According to Margaret Joyal, “The vast majority of [people], if nobody died, if they were safe, if things were able to return to normal—60% of people will never come in for mental health services and they won’t need to.” Those who may not benefit from formal mental health services can still be benefited by using resources that support the recovery of emotional well-being. Since storytelling initiatives were successful in the wake of Irene, the VDH could also consider therapeutic group conversations about natural disasters. Although we were unable to successfully study the importance of faith centers as they specifically relate to coping with natural disaster and climate change, schools and faith centers

are generally recognized as trusted, safe spaces for people to engage in these discussions and seek help. Initiating dialogues about emotional health and the environments hosted by these organizations could perhaps increase people's involvement and trust in the Department of Health as resource that would be personally useful to them and their families.

In thinking about the effects of a potentially traumatic event, it is helpful to bring back Ben's words: "It's funny that it was three years ago cause it feels like it was ten. . . and at the same time it feels like it was just yesterday." His words reflect the tricky nature of time in coping with complex emotions after a potentially traumatic event. Since we know that people are preoccupied with the material cleanup in the weeks and months after an extreme weather event, it is important to keep in mind that some emotions do not surface and are not processed for months to years, so long term counseling resources should be offered as well.

One interviewee who worked at Rochester School told us simply, "as a culture we really need to watch for the children." Children demonstrate a unique and honest ways of grappling with conflicting emotions and a particular kind of imaginative resilience. Since climate change models predict increasing frequency and severity of storms, we must be proactive in bringing younger generations into climate change dialogues. Our own conversations with young students demonstrate the need to continue developing and circulating curricula, film, and events similar to those initiated and organized by the Vermont Institute of Natural Science (some of which were implemented in conjunction with Washington County Mental Health Services) as well as work done by the Vermont Campus Compact (Lesley-Ann Dupigny-Giroux, personal communication). We recommend continuing to work with Dr. Dupigny-Giroux and these organizations specifically to identify resources that connect education to psychological support infrastructures (where this support system could include school guidance counselors, teachers,

counseling services outside the school, or any number of trusted organizations in the community which offer psychosocial support) and that help develop innovative ways to facilitate intergenerational conversations about climate change that create a space for people to share their personal stories.

Conclusion

In November of last year President Barack Obama declared November “Critical Infrastructure Security and Resilience Month.” In this presidential proclamation he cast the threat of natural disasters and impacts of climate change through a national security frame alongside terrorist threats and cyber attacks:

We must continue to strengthen our resilience to threats from all hazards including terrorism and natural disasters, as well as cyber attacks. We must ensure that the Federal Government works with all critical infrastructure partners, including owners and operators, to share information effectively while jointly collaborating before, during, and after an incident. This includes working with infrastructure sectors to harden their assets against extreme weather and other impacts of climate change.
(President Barack Obama, 2013)

In our research over the past few months we have seen the importance of better-organized and implemented emergency response and communication infrastructure. Streamlining logistics in the wake of a natural disaster can avoid unnecessarily amplifying the fear and stress of the event itself. As important, however, is the development of a *psychosocial* infrastructure that facilitates building psychosocial resilience.

Our conversations with Vermonters through surveys and interviews have demonstrated that, while some are beginning to or already have resumed their normal lives, many still have experience strong negative and positive emotions which run the emotional gamut three years later. Often these complex emotions coexist within the same individual. They are felt across

many ages. Based on our findings, community support plays a crucial role in how people recover from a severe storm. When we asked high school student Katelynn if she was worried about a future storm, she said deliberately, “I have a strong feeling in my gut that it’s going to happen again, I just don’t know when.” It is our hope that our retrospective study allows us to become more attuned to sentiments like Katelynn’s as we are encouraged to think *forward* in how we practice emotional resilience in a quickly changing world.



Figure 6. The residents of Rochester, Vermont display resilience and adaptation by building a footbridge to reconnect with their community in the aftermath of Tropical Storm Irene (http://photos.masslive.com/republican/2011/08/irene_143.html).

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Personal Interviews

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Cooper, Tracy. Personal Interview. 14 Nov 2014.

Michael. Personal Interview. 6 Nov 2014.

Domas, Sue. Personal Interview. 17 Oct 2014.

Nick. Personal Interview. 6 Nov 2014.

Dylan. Personal Interview. 6 Nov 2014.

Fiske, Robin. Personal Interview. 14 Nov 2014.

Chloe. Personal Interview. 6 Nov 2014.

Johansen, Marty. Personal Interview. 18 Nov 2014.

Johansen, Sue. Personal Interview. 18 Nov 2014.

Johansen, Zach. Personal Interview. 18 Nov 2014.

Joyal, Margaret. Personal Interview. 24 Nov 2014.

Kimble, Matthew. Personal Interview. 13 Nov 2014.

Kravitz, Brian. Personal Interview. 17 Nov 2014.

Daniel. Personal Interview. 6 Nov 2014.

Cody. Personal Interview. 6 Nov 2014.

Linda Gendreau’s 2nd Grade classroom (10 students). Personal Interview. 21 Nov 2014.

Lisa Cruikshank’s 3rd/4th Grade classroom (15 students). Personal Interview. 21 Nov 2014.

Manley, Patricia. Personal Interview. 22 Oct 2014.

McFarlin, Isabella “Ladybelle”. Personal Interview. 14 Nov 2014.

Meadows, Robert. Personal Interview. 21 Oct 2014.

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Straus, Larry. Personal Interview. 16 Nov 2014.

Benjamin. Personal Interview. 6 Nov 2014.

White, John. Personal Interview. 30 Oct 2014.

Appendix A: Survey

Community Survey: Tropical Storm Irene

Thank you for taking our survey! We are a group of Middlebury College seniors conducting a study on the after-effects of Tropical Storm Irene on Vermont communities. Everything you contribute will be kept anonymous. Our final project will be posted on the Middlebury College Environmental Studies website and be accessible to other organizations. If you'd like more information on the project, please feel free to contact us at: MiddleburyStories@gmail.com or call Caroline at (781) 254-5305.

Thank you,

Caroline, Anna, Victoria, Sarah & Piper

Middlebury College Students

1. Generally speaking, where do you live within Rochester? (For example: near the river, center of town, on a hill near the town, etc. Specific address not required.)
2. Did your property flood?
3. Did you experience any personal losses?
4. Did you spend money to respond to these or other losses? (Please circle.)

None A Little A Fair Amount A Lot A Very Challenging Amount
5. What were the effects of Tropical Storm Irene on you and your family?
6. And what about your friends and neighbors?
7. Do you remember what emotions you experienced during and immediately following Tropical Storm Irene? (For example: worry, trouble sleeping, relief, fear, regret, stress, gratitude, etc.)
8. Which, if any, of these emotions do you still experience?
9. Have you taken preventative measures for future storms?

Thank you for your participation! **We would love to interview you at your convenience if you would like to share more of your story.** If you're interested in an interview, please leave your name and phone number on the attached page. Your name will not be connected to your survey; it is only for contacting purposes. Interested in a personal interview? Please leave your name and contact information below:

We have some simple demographic questions to ask. Feel free to contribute as much information as you would like.

Gender: _____	Age: _____		
Profession: _____			
Income: (Circle one.)			
less than 24,999	25,000 to 49,999	50,000 to 99,999	100,000 or more

We neither gave nor received unauthorized aid on this assignment.
VB, CF, SG, AM, PU